

Application No.: 09/821,753Docket No.: 2328-053**REMARKS**

Claims 10 and 38 have been amended to include periods at the end of the claims to overcome the objection on page 2 of the Office Action.

To expedite prosecution, claims 34-37 have been cancelled and replaced by new independent claim 42, as well as dependent claims 43 and 44. Claims 38-41 now depend, either directly or indirectly, on claim 42.

Claims 1-16, 8-13, 17, 18, 20-23, 25- 26, 28 and 30-33 were incorrectly rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement.

Applicants can not agree with the comment in the Office Action that the application as filed does not provide support for the requirement for the AC etchant plasma to always be the dominant material applied to the workpiece while the feature is being formed. While the specification does not use this exact language, the detailed description on page 16, line 23 - page 17, line 4, makes it evident that while the feature of a rounded corner is formed, etchant material is the dominant material applied to the reference. Page 16, line 23; page 16, line 26; and page 16, line 27 indicate the "final etch operation" form round edge 216 as a result of HBr/O<sub>2</sub> continuously flowing into the chamber for 15 seconds. Such a "final etch operation" could only occur if the HBr etchant were dominant over the O<sub>2</sub> passivation gas, as one of ordinary skill in the art would recognize. Page 17, line 5 provides further evidence that the HBr etchant is dominant by stating the etchant gases are purged from the chamber after base 21 has been reached. Based on the foregoing, the rejection of claim 1 and the claims dependent thereon under 35 U.S.C. §112, first paragraph, is incorrect and withdrawal thereof is in order.

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The rejection of all previously pending claims as a result Bhardwaj et al., in view of Howald et al., is incorrect. In making this rejection, the Examiner ignores the requirement for the etchant to be the dominant material applied to the chamber. The Bhardwaj reference clearly indicates, and is focused on, the concept of alternately supplying etchant gases and deposition materials to the chamber during formation of a feature. The comment in the Office Action that the broadest interpretation of "feature" could be a small portion of a trench, is without foundation in the record. It is evident from page 16, line 21 – page 17, line 19 of Applicants' disclosure that a feature is not a small portion of a trench, but is a desired, complete shape, such as a rounded corner of a trench. The Examiner must provide evidence to support her position that a feature can properly be defined as a small portion of a trench.

Further, some of the dependent claims specifically indicate the nature of the feature. For example, claim 8 requires the material to be shaped to have a rounded corner that includes the formed feature, and claim 9 requires the gradual power change and continuous application of plasma to the workpiece to form a trench wall including the rounded corner, wherein the trench and the rounded corner are included in the formed features. Claim 10 requires the rounded corner to be at an intersection of a wall and a base of a trench, and claim 11 requires the rounded corner to be at an intersection of a wall and a surface intersecting the wall, wherein the surface extends generally at right angles to the wall; similar limitations appear in claims 20-22. Consequently, the Examiner's arguments concerning Bhardwaj et al., and the previously rejected claims are clearly inappropriate.

The Office Action, on page 4, includes the following statement: "Note that inherently a gradual power change will also produce a rounded profile in Bhardwaj et al. since the gradual power change in the instant application similarly produces a rounded profile." This statement ignores the fact that the gradual power change in the present application is quite different from the gradual

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power change in Bhardwaj et al. In the present application, if the power remains constant for more than one second, the desired results are not achieved, as pointed out on page 13, lines 15 and 16 of the present application. In contrast, column 6, lines 50-67 of Bhardwaj et al. indicates the steps have a duration between 2 and 15 seconds, and preferably have a duration of 4-6 seconds. Further, column 2, line 26 of the Bhardwaj et al. reference indicates the steps have periods of less than 7.5 or even 5 seconds to reduce surface roughness. Based on the foregoing, it is improper for the Examiner to rely on Applicants' disclosure to show that Bhardwaj et al. inherently forms a feature by maintaining the power constant for no more than one second. The implication of "even 5 seconds" is that 5 seconds is close to the minimum.

The Examiner is merely speculating that Bhardwaj et al. forms a feature by maintaining power constant for a period. It is necessary for the Examiner to show that Bhardwaj et al. necessarily forms a feature by using the parameters disclosed therein. Applicants' disclosure fails to provide such evidence because Applicants' parameters are so different from those of Bhardwaj et al. Further, Applicants note their preferred power steps, wherein the power steps are a few milliwatts that remain at a constant power for about 1 millisecond, as defined by claims 13 and 26, which further require the etchant plasma to be continuously applied to the workpiece while the feature is being formed, are orders of magnitude different from the constant periods and power steps of Bhardwaj et al. Hence, this is further evidence of Applicants' disclosure failing to provide inherency for the Bhardwaj et al. disclosure to include the requirements of claim 1.

New claim 42 is directed specifically to a method of forming a rounded corner of a trench of a workpiece in a vacuum plasma chamber. The method comprises converting a gas species that is supplied to the chamber into an etchant plasma that is continuously applied to the workpiece while the rounded corner is being formed. The power applied to the etchant plasma is gradually changed

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while the rounded corner is being formed. The gradual changes are such that the power does not remain constant for durations in excess of 1 second while the rounded corner is being formed. While the rounded corner is being formed, the following parameters are maintained constant:

- (a) the pressure in the chamber;
- (b) the flow rate of the gas species into the chamber; and
- (c) the species flowing into the chamber.

The foregoing combination of steps is not disclosed in the references of record.

New claim 43 requires the species to include an etchant gas and a passivation gas, and claim 43 requires the etchant gas to be the dominant gas. Claims 38-40 define specifics of the preferred embodiments of the nature of the steps of the power variations that are different orders of magnitude from the parameters of Bhardwaj et al.

In view of the foregoing amendments and remarks, favorable reconsideration and allowance are respectfully requested and deemed in order.

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To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 07-1337 and please credit any excess fees to such deposit account.

Respectfully submitted,

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